STORMWATER MANAGEMENT REPORT

Site Plan of Land
"The Residences at Burns Avenue"
Walpole, Massachusetts

February 7, 2019

Prepared for:

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Introduction:

The applicant, Wall Street Development Corp., is proposing to develop a 36 Unit Condominium project, located off Burns Avenue and Union Street, in Walpole Massachusetts. The proposed project was filed with Massachusetts Housing pursuant to Massachusetts General Laws Chapter 40B. The 36 Units will be townhouse style dwellings in a condominium association. The existing property consists of a single family dwelling and undeveloped wooded area. The total project area consists of 3.27 acres.
The proposal is to raze the existing house at 48 Burns Avenue and accessory buildings. The Project will be serviced by Town water, sewer and other available public utilities. The stormwater generated from the Project will be captured, conveyed, treated and mitigated on-site utilizing Best Management Practices.

The purpose of these calculations is to demonstrate design compliance of the Project's stormwater management system for water quality and quantity, specifically post-development peak discharge rates per the DEP's Stormwater Management Policy, the Town of Walpole Land Subdivision Regulations. As designed, the system will mitigate peak rates of runoff for storms up to and including the 100-year event under post-construction conditions.

Methodology/Sources of Data:

The overall storm water management plan for the project is designed to maintain the peak rate of storm water runoff from the site after development. The Soil Conservation Service Modified Soil Cover Complex Method, the computer program "HydroCAD" by Applied Microcomputer Systems, and the procedures specified in Urban Hydrology for storm Small Watersheds were used to determine pre-and post-developed peak flow rates of runoff from the site. The 2, 10, 25 and 100-year, 24-hour storm frequencies were used in the comparison of pre and post- development conditions. The rainfall data for the Type III, 24-hour storm events follow:

Frequency (Years)	Rainfall (inches)
2	3.25
10	4.90
50	6.10
100	7.00

The storm water runoff will be controlled through the use of "Best Management Practices" and in conformance with the MADEP Stormwater Management Policy.

Soils:

The Natural Resources Conservation Service, Hydrologic Soils Group Map indicates that the on-site soils consist of Sudbury fine sandy loam (260B) in the vicinity of the existing dwelling. The remaining area consist of Scarboro & Birdsall with a hydrologic rating of A/D. On-site soil testing was performed by our office on June 8, 2016. The field testing determined that area has been filled with deleterious material ranging in depth from 52 to 84 inches. The parent material below the fill was classified in the field as fine sandy loam. A conservative infiltration rate of 0.52 inches/hour was utilize in sizing the infiltration basin and roof system. The fill material will be removed below the infiltration systems to the depth of the parent material and replaced with clean sand material that is compliant with Title 5 sand.

The existing surface area material was classified as hydrologic group group D based on the fill material.

Existing Site Conditions:

The project site is located off the Union Street the end of Burns Avenue. The existing property consists of a single family house at the end of Burns Avenue and undeveloped woodlands. The total project area consists of 3.27 acres.
The site slopes from a high point located in the interior, to the south where this is a wetland area and north towards Union Street. The existing stormwater runoff from the site flows via overland flow to the south wetland area and to the north where it enters a culvet under Union Street.

The stormwater runoff generated from the existing site discharges to two (2) design points. Subcatchment 1E flows via overland flow to the wetland area along the southern boundary. Subcatchments 2E and 3E flow via overland towards Union Street and are combined in Link 1L.

Description	Comments
1E	Overland flow southern boundary
1L	Overland flow towards Union Street

Post-developed Runoff:

The Project will consist of razing the existing dwelling at the end of Burns Avenue and the accessory buildings. The proposed project will consist of the construction of thirty-six (36) townhouse style units with associated driveways, public utilities, and grading. A twenty-four (24) foot wide access road will be constructed from the end of Burns Avenue to a cul-de-sac providing access and egress. The Runoff generated from the Project will be collected via deep sump catch basins where it will be conveyed to a retention basin for mitigation along the southern boundary. The proposed system will reduce or match all post-development peak flows for all design storms including the 100-year storm event.

The runoff areas have been divided into four (4) subcatchments. Subcatchments 1D and 2D discharge towards the southern boundary. Subcatchment 1D is directed into the retention basin and 2D bypasses the basin. The total discharge is combined Link 2L for comparison of offsite impacts.

Subcatchments 3D and 4D discharge towards Union Street. The total flows are combined Link 3L for comparison of offsite impacts.

Description	Design Point	Comments
1D	2L	flow into drainage basin
2D	2L	Overland bypassing basin
3D	3L	flow towards Union St.
4D	3L	flow towards Union St.

The following is a summary comparison of peak flows:

Summary of *Peak* Stormwater Runoff Rates								
Design Point	2Yr Peak Flow (cfs)		10-Yr Peak Flow (cfs)		25-Yr Peak Flow (cfs)		100-Yr Peak Flow (cfs)	
	Exist.	*Prop.*	*Exist.*	*Prop.*	*Exist.*	*Prop.*	*Exist.*	*Prop.*
(1E) 2L	2.54	0.67	5.10	3.34	7.06	5.53	8.56	7.05
(1L) 3L	1.64	1.65	3.43	3.32	4.83	4.60	5.90	5.57

The following is a summary comparison of peak volumes:

Summary of Stormwater Runoff Volumes								
Design Point	2-Yr Volume (ac-ft)		10-Yr Volume (ac-ft)		25-Yr Volume (ac-ft)		100-Yr Volume (ac-ft)	
	Exist.	*Prop.*	*Exist.*	*Prop.*	*Exist.*	*Prop.*	*Exist.*	*Prop.*
(1E) 2L	0.24	0.16	0.47	0.39	0.65	0.57	0.80	0.71
(1L) 3L	0.16	0.16	0.32	0.31	0.45	0.43	0.55	0.53

The following is a summary of the Retention Basin:

Summary of Retention Basin								
Design Point	2-Yr Volume (cu.ft.)		10-Yr Volume (ac-ft)		25-Yr Volume (ac-ft)		100-Yr Volume (ac-ft)	
	Peak Elev.Ft.	*Outflow (cfs)*	*Peak Elev. Ft.*	*Outflow (cfs)*	*Peak Elev.Ft.*	*Outflow (cfs)*	*Peak Elev.Ft.*	*Outflow (cfs)*
1P	110.16	0.50	110.58	2.99	110.81	4.91	110.96	6.27

The proposed pipe network has been designed to convey stormwater flows for the 25-year storm event.

Summary:

The calculations performed for all design storm events indicate that there is no net increase in the peak rate of runoff or volume for the Project as proposed. Therefore, with the implementation of the stormwater management system as designed, there will be adequate protection against pollutants, flooding, siltation, or other drainage problems. The stormwater management system along with the Operation and Maintenance plan contained herein will satisfy all of the objectives of the DEP's Stormwater Management Regulations and the Town of Walpole Subdivision Rules.

Massachusetts Stormwater Management Standards:

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the commonwealth:
All new stormwater discharges will be treated and remove a minimum of eighty (80) percent total suspended solids. The surface runoff from the proposed impervious surfaces will be treated and mitigated prior to discharge to abutting properties.

Standard 2: Stormwater management systems shall be designed so that the Post-developed peak discharge rates do not exceed Pre-developed peak discharge rates:
The proposed project as designed will result in no increase in post-development runoff over pre-developed rates. ***See Appendix A.***

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater best management practices and good operation and maintenance:
No proposed change from existing.

Standard 4: Stormwater management systems shall be designed to remove 80% of average annual post-construction load of total suspended solids (TSS):
The proposed design will provide treatment and groundwater recharge through the use of an infiltration basin to control runoff from the impervious surfaces.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce discharge of stormwater runoff from such land uses to the maximum extent practicable:
The project is not a land use with higher potential pollutant load (LUHPPL).

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of specific source control and pollution prevention measures and specific structural stormwater best management practices determined by the department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.
The project site is not located in a Critical area.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extend practible:
The proposed project is not a redevelopment.

Standard 8: A plan to control construction-related impacts, including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented:
The proposed project plan set includes an erosion control plan to be implemented during construction period. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to the commencement of construction.

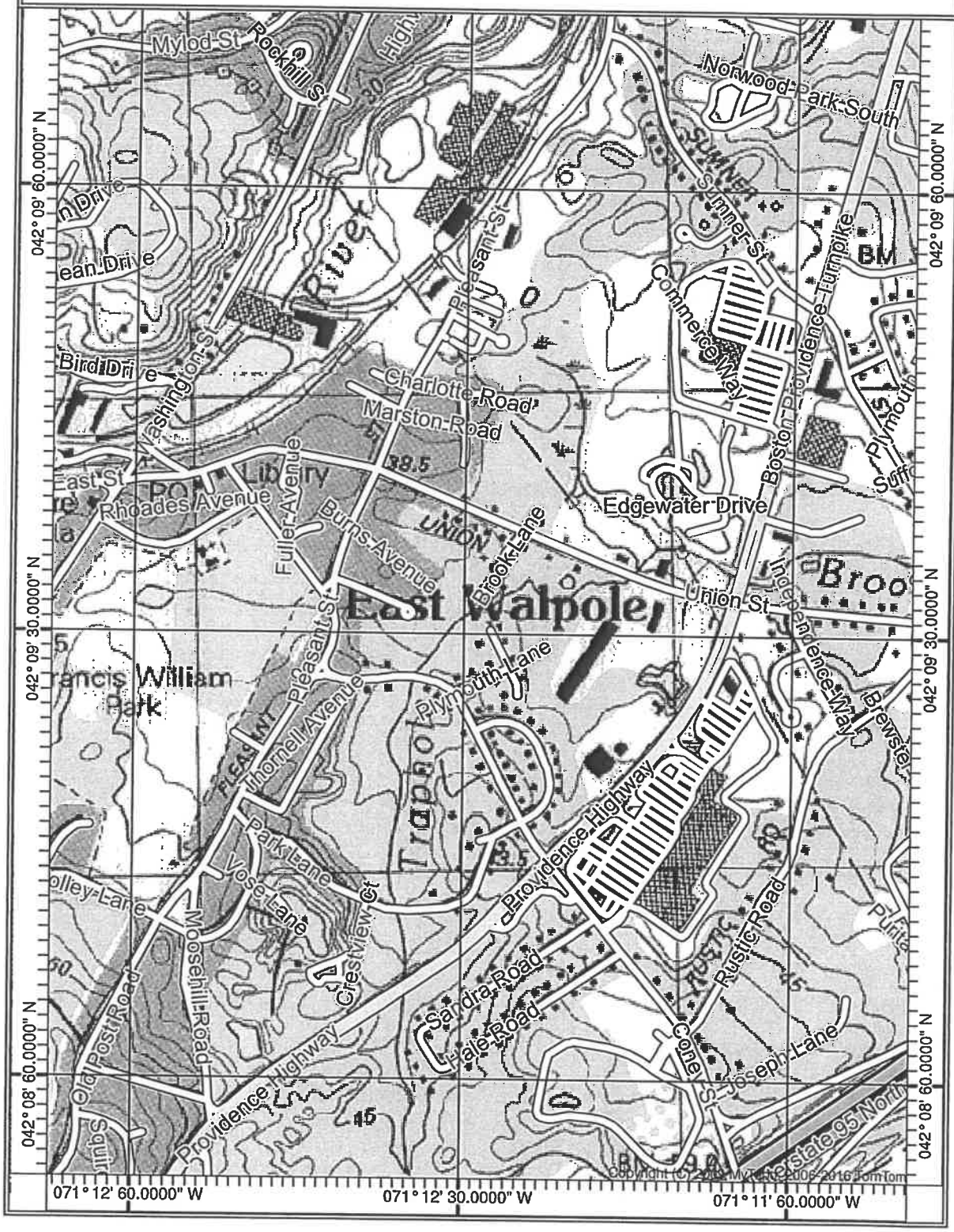
Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed:
A Stormwater Operation and Maintenance Plan are included. ***See Appendix D.***

Standard 10: All illicit discharges to the stormwater management system are prohibited:
An Illicit Discharge Compliance Statement was prepared for the project. ***See Appendix E.***

Map Name: NORWOOD
Print Date: 10/19/16

Scale: 1 inch = 1,000 ft.
Map Center: 042° 09' 33.5772" N,

Horizontal Datum: NAD27



SCALE 1:12000

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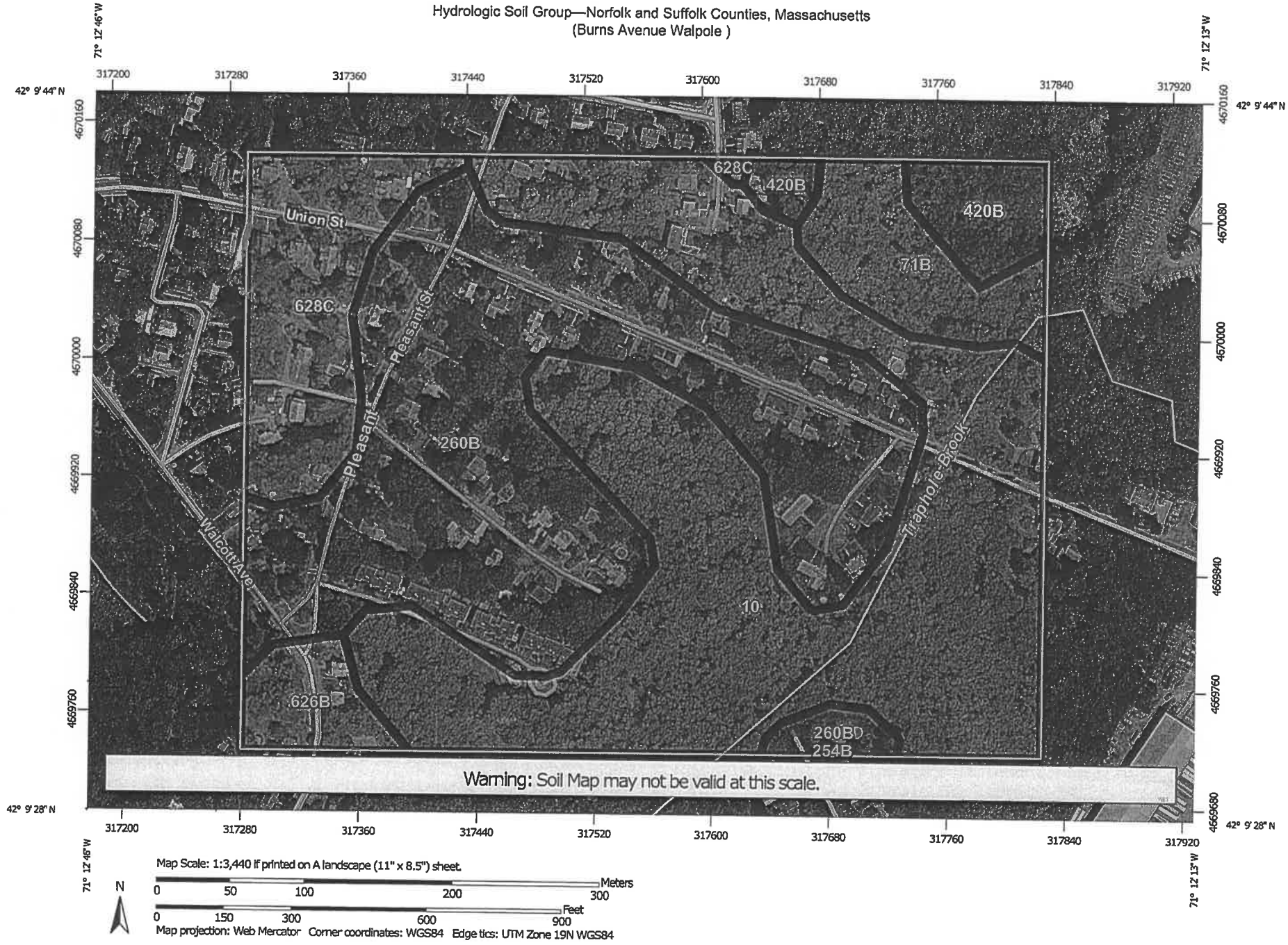
FEET

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts
(Burns Avenue Walpole)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 12, Sep 15, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 26, 2014—Sep 4, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Norfolk and Suffolk Counties, Massachusetts (MA616)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	A/D	22.8	41.8%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	3.0	5.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	0.0	0.1%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	20.2	36.9%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	2.0	3.6%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	1.5	2.8%
628C	Canton-Urban land complex, 3 to 15 percent slopes	A	5.1	9.3%
Totals for Area of Interest			54.7	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher